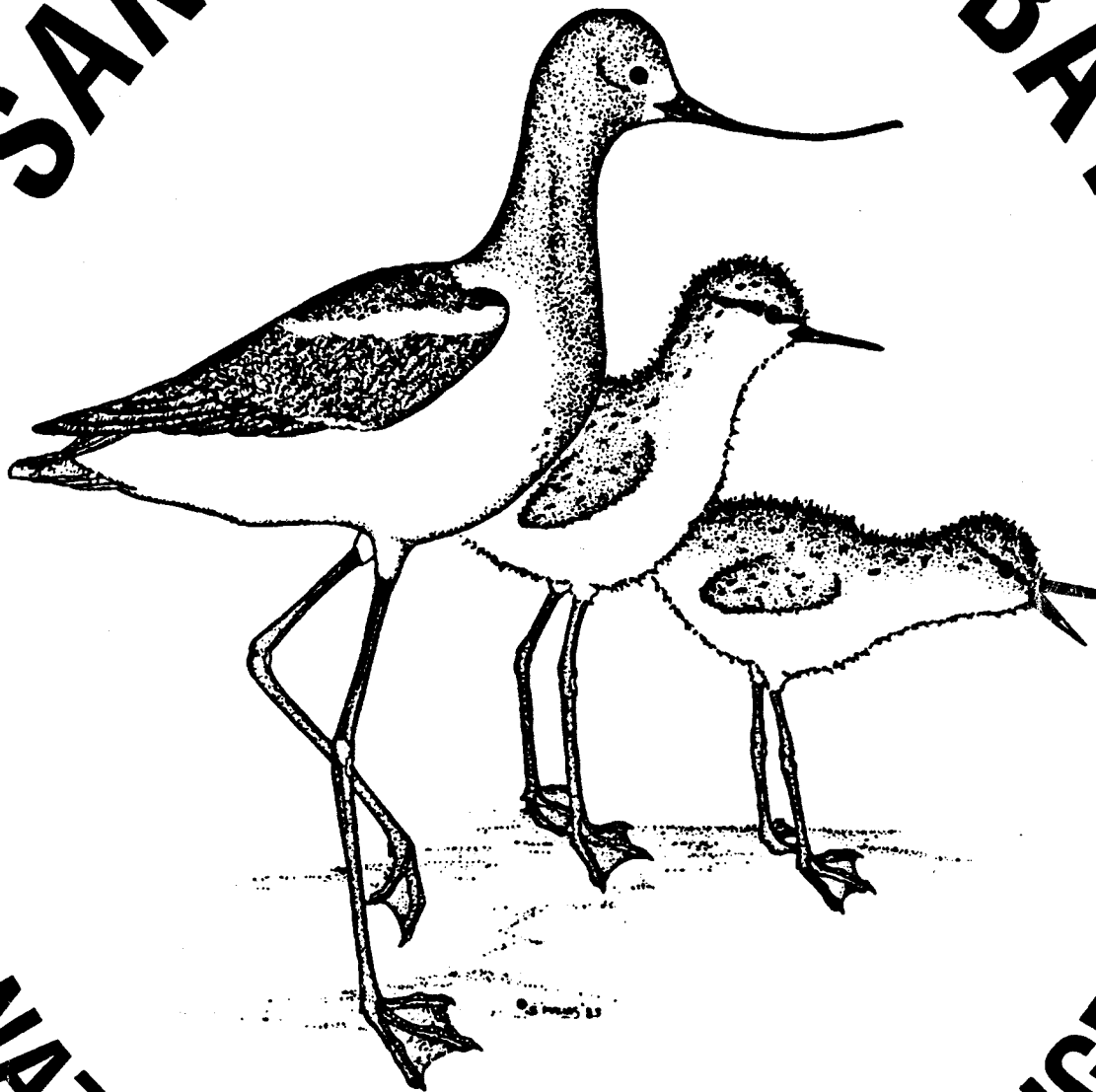


SAN FRANCISCO BAY



NATIONAL WILDLIFE REFUGE

Annual Narrative 1991
Public Use Sections

**ANNUAL NARRATIVE
EDUCATION AND OUTREACH SECTIONS**

- E2. Youth Programs
- E4. Volunteer Programs
- H1. General Public Use
- H2. Field Trips (Outdoor Classrooms) - Students
 - a. Environmental Education Center
 - b. Visitor Center
- H3. Field Trips (Outdoor Classrooms) - Teachers
 - a. Educator Workshops
 - b. Educational Resources
 - c. Educational Programs and Committees
- H4. Interpretive Trails
- H5. Interpretive Routes
- H6. Interpretive Exhibits and Demonstrations
- H7. Other Interpretive Programs
- H9. Fishing
- H10. Trapping
- H11. Wildlife Observation
- H12. Other Wildlife Oriented Recreation
- H13. Camping
- H14. Picnicking
- H15. Off-Road Vehicles
- H16. Other Non-Wildlife Oriented Recreation
- H18. Cooperating Associations
- H19. Concessions

1991 ANNUAL NARRATIVE EDUCATION AND OUTREACH SECTIONS

E2. Youth Programs, Boy Scouts and Girl Scouts

During 1991, the Refuge had 4 employees involved with the Boy Scouts of America. A total of 850 hours, consisting of 250 hours of duty time and 600 hours of volunteer time, were logged. We cooperated and worked with the local girl scout council again this year. A total of 100 staff hours and 75 volunteer hours were logged, mostly in the late summer.

The Refuge's Conservation - Natural Resource Explorer Post held its fourth successful Open House in October 1991. Approximately 50 youths and parents attended resulting in 15 youths registering. Some changes were made in the program this year. All participants took part in a 10-hour modified Refuge Volunteer Training and officially became part of the Refuge Volunteer Staff. The Explorers were required to volunteer 8 hours a month at the Refuge in addition to their biweekly meetings and field trips. To fulfill this requirement, they did several group projects (maintenance, painting, and nursery work) and individually they did trail patrol, fishing pier patrol, Visitor Center desk duty, office work and helped with special event days. This new approach seemed to work well. It enabled the Explorers to be more involved in the Refuge and the Refuge benefited from their help on projects.

Staff and volunteers continued to meet, upon request, with girl and boy scout troops during after school and weekend visits to the Refuge. Usually the troops were fulfilling requirements for badges and the staff or volunteers presented programs based on what the troop leader requested.

E4. Volunteer Program

Once again, volunteers were vital to the continued success of many of the Refuge's programs. In the interpretation department, volunteers staffed the Visitor Center 95% of the time, patrolled the Refuge trails and fishing piers, presented 99% of the weekend interpretive programs, including walks, slide shows and tours. Volunteers provided many staff with administrative help in the office and also assisted with the many maintenance projects around the Refuge. Many resource management projects, like clean ups at Salinas River Refuge utilized volunteers. When the positions for Environmental Education Specialists were temporarily vacant, volunteers kept the environmental education program running smoothly. Eventually, the positions were filled with skilled, dedicated and experienced people who knew the program, of course they were the volunteers. Kathy Rickelman, an SCA intern, and Sandy Spakoff, a Refuge volunteer, both have been added to the staff as Environmental Education Specialists.

Other highlights for 1991 included an Environmental Education Pavilion built near the Visitor Center in Fremont to increase the availability of the site for environmental educators and their students. Volunteers from Pacific Gas and Electric Company (PG&E) raised support pilings donated by their company and 22 volunteers from the Fremont Rotary Club assisted with the construction along with Refuge volunteers and staff. All materials for the Pavilion were donated. The Pavilion allows students and teachers to have a sheltered area right next to their area of study, the salt marsh. (See also Section 2Hb.)

Volunteers were vital to the success of many Refuge events including the Native Plant Sale, Kids' Day, Earth Day and National Wildlife Week, Halloween Open House, Coast Clean-up and the Wildlife Arts and Crafts Fair. Over 600 volunteers participated in these events, setting up, cleaning up, and helping over 5,000 people learn about the Refuge. (See also Sections H6 and H7.)

Many projects like habitat restoration involve doing tedious work like weeding of non-native plants, but volunteers have taken it upon themselves to do away with the persistent mustard and fennel on the Refuge. Volunteers from a local school participating in a Community Service Day, cleared an area and seeded it with native grasses. As part of Earth Day, another school group planted trees from the Refuge Native Plant Nursery (another volunteer project) around the Visitor Center to provide habitat for wildlife and to beautify the area. A few days counting butterflies turned out to be a rewarding outing for volunteers and resource management staff as almost 2,000 of the endangered Lange's Metalmark butterfly were surveyed at its peak.

Some of our youngest volunteers shared their knowledge with their peers during this past summer's Junior Naturalist program. These volunteers, previous graduates of the Junior Naturalist program, assisted staff in teaching 3rd through 6th graders about the salt marsh and the importance of preserving the environment. (See also Section H2b.)

Total hours contributed by volunteers for the year was 31,470, amounting to a savings to the government of \$25,460. This included Refuge volunteers, non-Refuge volunteers and Student Conservation Association (SCA) interns. Over 110 Refuge volunteers, those who have completed a 20 hour training and orientation, contributed over 22,020 hours. While non-Refuge volunteers, like school groups, boy scouts, girl scouts and other individuals contributed 3,250 hours.

This past year there were 12 SCA interns who contributed 6,200 hours. Each intern worked 40 hours a week for 12 weeks. In exchange for their full time volunteer services, the Refuge provided them with housing and a small subsistence of \$50.00 per week. One intern worked a double term, extending her 12 weeks to 22 weeks. Five of the SCA interns worked with the Wildlife Biologists, assisting with a study on the endangered California clapper rail. This year long study, involved long hours, usually late in the evenings, doing population and predator surveys, as well as collecting telemetry data.

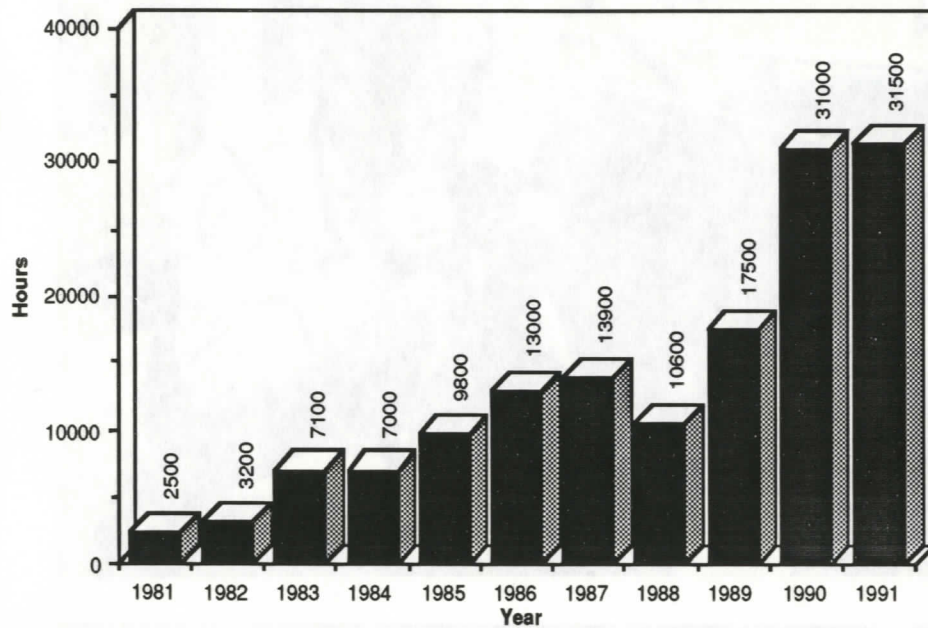
The seven other interns were just as vital to the environmental education program. Over 13,000 students, their teachers and parents went through the field trip program. SCA interns were essential in assisting with teacher orientations, field trips, classroom presentations, Marsh-In Camp and the Junior Naturalists program. (See also Sections H2 and H3.)

In June, Refuge volunteers were recognized for their efforts at the annual Volunteer Picnic and Recognition Ceremony. The ceremony was held in the new pavilion, though still roofless, provided an ideal setting for the presentations. Chickens, steaks and hot dogs were barbecued by staff and everyone else brought a dish to share. All volunteers received a Certificate of Appreciation provided by the Regional Office. In addition, Jean Noll, Steve Herrick and Alvin Dockter, the Volunteer of the Month received special recognition with a framed write-up of their volunteer accomplishments. Volunteers who had accumulative hours in increments of 500 and 1000 hours were recognized with special pins.

The highlight of the Volunteer Awards Ceremony was the recognition of volunteers who had the top ten number of hours for the past year. Those volunteers received a bird feeder and a certificate signed by the Secretary of Interior for their tremendous contribution in time and effort to the Refuge. They were Ida Berkowitz, Howard Collins, Ken Crowley, Jack Runyan, Alvin Dockter, Helen & Stanley Kalick, Arthur Wellens, Stan Brown and Lee Lovelady. Volunteer of the Year honors went to Jean Noll who volunteered over 500 hours to the Refuge. She was presented with a framed wildlife art print.

One advantage of the location of an urban wildlife refuge is that there is a large population base located nearby that serves as a vast reservoir of potential volunteer candidates. We recruit new people through displays at various off-site fairs, word of mouth advertising, and articles in the quarterly *Tideline* newsletter. An application which describes the volunteer program is available in the Visitor Center. We conducted three 20-hour trainings sessions for new volunteers in 1991. A total of 47 people completed the training and became official Refuge volunteers.

Volunteer Hours **San Francisco Bay National Wildlife Refuge Complex**



Farallon NWR hours not included, 1981-9189



Refuge explorer scouts spent a day working with staff and volunteers pulling unwanted ice plant at Salinas River National Wildlife Refuge.



Refuge Volunteer Alvin Dockter is on hand to photograph most Refuge events. He has contributed photographs used in the *Tideline*, in brochures, newspaper articles and the FWS News.



Watering the office plants is just one of many things that Volunteer Susan Moss does for us. She also handles all the recycling, patrols the trails, staffs the Visitor Center Desk and helps in the Native Plant Nursery.



Refuge staff and volunteers take time out from a hectic day to enjoy a Thanksgiving lunch together in the Visitor Center Auditorium.

H. PUBLIC USE

H1. General Public Use

San Francisco Bay National Wildlife Refuge serves a dense, local population of more than 7 million people. It is an ideal place for Bay area urbanites to visit a relatively unspoiled area, enjoy the local wildlife and learn about nature, conservation and wildlife management. During 1991, 300,000 people visited to Refuge. Of these, 10,765 students, 413 teachers and 2060 other adult leaders attended classroom activities at the Environmental Education Center in Alviso and the Visitor Center in Fremont. Thirty thousand people stopped in at the Visitor Center and 6800 attended interpretive programs, special events, artist receptions and other events held at the Visitor Center. Many more visitors received our self guided interpretive messages when they read our wayside exhibits.

Two thirds of our 1991 visitors participated in recreational activities other than formal programs at one of the centers. The public fishing area, trails and sloughs were used by visitors. Many of these people were contacted in the field by Refuge volunteers on patrol.

General public use is limited at the Environmental Education Center (EEC). The EEC is only open Monday through Friday between 8 a.m. and 4:30 p.m. due to staffing constraints. The number of drop-in visitors at the EEC that were counted totaled 4054.

The Visitor Center in Fremont was open 7 days a week from 10 a.m. to 5 p.m. and was closed all Federal holidays due to limited funding for staff. The trails and fishing piers remained open during all daylight hours everyday except New Year's Day, Thanksgiving and Christmas.

H2. Field Trips (Outdoor Classrooms) - Students

During 1991, the Environmental Education Program staff at both sites (the Environmental Education Center in Alviso and the Visitor Center in Fremont) devoted the first three weeks of September to curriculum development and equipment and educational props inventory and replacement. Demand for school group use during this time is limited. Fall reservations began on August 1st and spring reservations began on December 1st. With this type of booking schedule, we had minimal field trip cancellations.

Field trips involve students in indoor and outdoor activities revolving around a central theme chosen by the teacher for the field trip. Audio visual material, including films, and slide shows are provided. A ratio of 10 students to 2 adults is strongly encouraged to provide an enhanced learning experience for the students while at the Refuge. One adult is the activity leader at a learning station and the other acts as a chaperone, leading a group of 10 students to each learning station.

With a small staff at both sites, many of the bookings for our programs would not be filled without the aid of Student Conservation Association interns (SCA) and a few dedicated volunteers. The volunteers and SCA's learn the basics of the Environmental Education program and then either lead particular activities, present opening and closing programs and/or provide support to teachers/parent leaders conducting activities at the learning stations. When not busy with visiting school groups, SCA and volunteers help the staff with special projects which enhance the educational experience for visitors and students.

a. Environmental Education Program, Environmental Education Center, Alviso

The Environmental Education Center (EEC) was used extensively by many schools and groups in and around the San Francisco Bay area. The site was primarily used for school field trips, however other groups such as scouts and Junior Rangers also used the facility. The EEC served 6,628 Students, 277 Teachers/Educators, and 1,221 other adult leaders participating in the all day field trips. The Center also serves the general public. Drop-in visitors totaled 4,054. The combined total for all visitor and field trip usage for 1991 was 12,564 persons. This figure includes school groups, general public visitors (i.e. drop-in), workshops, meetings, field trip orientation participants, summer camps, and volunteer trainings.

Before the first of January 1991, all available dates for the 1991 winter/spring field trip program had been booked. To accommodate more groups, we double-booked on a number of days. The second school to book a field trip date had access to equipment, use of the EEC's habitats, and the patio with picnic tables to use as a learning station laboratory. The first group booking a field trip had access to two lab classrooms, an auditorium, an observation tower and a loft library as their indoor choices for learning

stations. It was difficult to double book field trips because the coordinator of the EEC was promoted to coordinator of the Environmental Education Program for the Refuge complex. We were only able to accommodate double bookings when a second staff person was able to be on site or when San Jose State University interns were available to assist with the second group. Therefore, for the fifth consecutive year there was a greater demand for the program than we were able to meet. Until additional staff is provided, the EEC will not be able to double book field trips even though there is an increasing demand for the program.

Two week-long sessions of our eleventh "Marsh-In" day camp were this year. The theme for 1991 was 'Living Together on One Earth'. It was attended by thirty-three 4th and 5th graders and four junior high school leaders. The fifth year of the five day program with an overnight session was a huge success. The camp sessions were taught by seven volunteer naturalists. The EEC staff designed and supervised the camp, acquired materials, made props, and conducted training sessions for the volunteers to introduce the concepts and activities used. The program was originally designed to serve the children living in the Alviso community; therefore, Alviso residents made up the majority of camp participants. Through the day camp, local children gain an understanding of and respect for San Francisco Bay NWR, wildlife, and habitats. By involving these young people in environmentally oriented activities and teaching them about the Refuge, we have been successful in gaining the acceptance of the local community.

The EEC held several special events during 1991. The following briefly describes these programs.

Open House - The Center held its annual public Open House on June 29th. There was a variety of activities and presentations focusing on the habitats and wildlife of the South Bay. One hundred people visited the site between the hours of 11am and 4pm. A copy of the flyer advertising this event is included at the back of this narrative.

Interpretive Programs in Spanish - The Alviso community has a large Spanish speaking population. To increase awareness and understanding of the Refuge and to strengthen the relationship with the Hispanic community, the Environmental Education Center held two Spanish programs. Spanish speaking interns and volunteers led both programs. The evening program on October 23rd was designed to give the community a sample of the activities done on field trips at the Refuge. The brine shrimp and owl pellet laboratories were enjoyed by all. The November 23rd program was a Saturday Open House. Community members were able to explore the building which is normally closed on the weekend. Our Spanish speaking intern and volunteers were on hand to answer questions and disseminate information. There were several presentations including: *Reptile Round-up* with Marty Marcus; a story, *The Great Sea Turtle*, and a showing of the Dr. Seuss film *The Lorax*. Community members visiting the programs totaled 89 persons. A flyer advertising this event is included at the back of this narrative.

Teachers design their field trip and may choose from the pumphouse, picnic shelter, pavilion, amphitheater, Visitor Center, eucalyptus grove, and the various designated trails as learning station sites for their activities. Staff members and SCA Interns may conduct opening and closing activities in the Visitor Center auditorium or the amphitheater depending on the selected activities. The newest addition to our facilities is the pavilion (the pavilion is explained later in this section); eventually the pavilion will be used for opening and closing activities as well. Both the pumphouse and pavilion serve as hubs for the daily field trips. The pumphouse is also used by California State University, Hayward, field biology and ecology classes to conduct studies on the salt marsh.

Through the San Francisco Bay Wildlife Society, we were able to add a video microscope to our equipment list. Students, teachers, and adult leaders enjoy experimenting with this fascinating piece of equipment. Most often the video microscope is used to display creatures found during mud studies on the television monitor.

In addition to the regular teacher led field trips, the Visitor Center staff also hosted the California School for the Deaf and Blind for a week. Each day a different class came to the Refuge for a guided walk of touching, smelling, and tasting and for an experience in the native plant garden; these students helped us plant grasses. These field trips offered a valuable experience for the participants as well as the staff.

During the summer months, while many students were enjoying their vacation, the environmental education staff offered the "Junior Naturalists" day camp program. Similar to previous years we offered the camp free of charge to third, fourth, fifth, and sixth graders. Sixteen third and fourth graders attended camp from July 15 through July 19, and 17 fifth and sixth graders attended camp from July 22 through July 26. A total of eight volunteer leaders assisted with the execution of the camp activities. The overall theme for Junior Naturalists 1991 was "Wildlife Explorers." Each day the activities focused on a different theme, thereby exposing the campers to wildlife issues. The daily themes were as follows: Monday - Species Countdown (Endangered Species), Tuesday - Nature's Tug of War (Balance of Nature), Wednesday - Wild Wetlands (Habitat Diversity), Thursday - Wildlife Hotel (Habitat Diversity), and Friday - Ghost Town Get-Away (Drawbridge Tour). Both weeks resulted in fun, learning experiences for everyone involved.

Girl Scout Day Camp - The Visitor Center was the site of a Girl Scout summer day camp held in August. One hundred girls and 30 adult leaders participated in activities during this week-long camp. Staff helped with programming and logistics. Girl Scout leaders attended a Teacher Orientation Workshop offered at the Visitor Center and they led the activities. The girls made murals depicting the marsh habitat, studied brine shrimp and owl pellets, watched nature videos and went on hikes. They also earned their compass badge and nature badge.

Fourth Grade Social Studies Teacher In-Service Day - The fourth grade social studies teachers from Alum Rock School District in San Jose held their in-service program at the EEC on November 21st. Thirty-one teachers and several district personnel spent the day discussing the social studies curriculum which centers around California Indians. The Center was chosen for the in-service because of its on loan exhibit of the Ohlone Indians and the fact that the schools are working toward integrating various subjects. The habitats at the site enabled the teachers to view the former homeland of the Ohlone and visualize how science (ecology) can be brought into a social studies curriculum.



During mud creature study, students and an adult leader on an all day field trip to the Refuge make exciting discoveries about what lives in the bay mud.

b. Environmental Education Program, Visitor Center, Fremont

The year 1991 proved to be another successful year for environmental education at the Visitor Center. Despite the lack of a permanent staff member during the first half of the year, Student Conservation Association interns Hillary Wood and Evan Forbes, (under the direction of the Environmental Education Program Coordinator) and Volunteer Sandy Spakoff adequately managed the program with the help of the Environmental Education staff at the EEC and the interpretation staff at the Visitor Center. The Visitor Center environmental education program offered teacher led field trips throughout the school year. A grand total of 4,137 students and 232 teachers and 743 adult leaders utilized our field trip program throughout the year.

Environmental Education Pavilion - The Refuge built a new environmental education classroom during 1991, out of contributed money, supplies and labor. San Francisco Bay National Wildlife Refuge's new Environmental Education Pavilion was scheduled to be dedicated during a ceremony on February 29, 1992. The Pavilion is a splendid example of government, industry, local businesses, civic organizations and private citizens working together as a productive team on an essential project. The finished pavilion will become one hub of the refuge's education program.

The contributors and volunteers who are participating on this project is a very long one. Catalyzed by a contribution from the Cargill Salt Company, building materials were purchased and work began last spring. Pacific Gas and Electric Company (PG&E) dug the holes for a number of huge power poles to serve as upright building supports, and used its equipment to place them in the holes. The Right Away Redy Mix company of Alameda contributed 7.5 cubic yards of concrete for the holes, which the company delivered and poured for free.

The Fremont Rotary club built the floor of the new classroom, framed in the walls, and later donated the money to buy the building's roof trusses. The Citizens Committee to Complete the Refuge provided money for more materials through the course of construction, and progress was steadily made throughout the year. Stairs and a wheelchair ramp were constructed by Refuge Volunteer Steve Herrick.

The walls were finished and a plywood roof was nailed on to the trusses by USFWS employees Steve Lewis, Steve Berendzen, Pat Koglin and Doug Roster. Power Engineering, Incorporated of Palo Alto donated a composition shingle roof which they installed in time for the first rain of the year in October. They were scheduled to return in January to donate and attach tongue-in-groove siding to cover the outside of the entire building.

Howard Collins installed all of the electrical wiring, and the power hookup was done for free by P.G. and E. Meanwhile, interior plywood sheathing and interior roofing was installed by Hank Lewis (former Newark Mayor), Niels Nielsen, Ken Grimes, Bill Buttz, Jack Gonselves and Larry Lira. They were assisted by the volunteers from Power Engineering, who finished the outer siding and had some time left over to help on the inside roof.

Native plants were planted around the new Pavilion by volunteers of the Refuge's Native Plant Nursery.

The U.S. Fish and Wildlife Service alone could never shoulder the cost of such a project. Only through the contributions of cash, materials and the time and talents of dozens of volunteers could such an idea become a reality. As a result of the dozens and dozens of volunteers who championed the project and paid for it, the Refuge will have a \$60,000 environmental education classroom, built largely by volunteers, at very little cost to the government.



During the Visitor Center's summer day camp, Junior Naturalists, campers demonstrate prey/predator relationships in an activity from the book *Sharing Nature With Children*.



The Girl Scout Day Campers gather at the amphitheater to get instructions before heading off on a nature hike.



Volunteer Steve Herrick and maintenance staff Mike Bitsko work together to complete the steps on the Environmental Education Pavilion.



The new Education Pavilion, completed in 1991 and dedicated in in early 1992. It was put to immediate use!

H3. Field Trips and Workshops (Outdoor Classrooms) - Teachers

In the San Francisco Bay Area, where many environmental education facilities and programs are available for teachers to choose from, the Refuge EE program is unique from all others. By having teachers fully responsible and highly involved in their field trip, they are more likely to integrate the classroom curriculum with their field trip. As a result, students achieve a more meaningful, in-depth experience.

We provide a facility where teachers can lead their own field trips following the training and guidance by the education staff. Teachers plan their field trip, prepare their students and conduct the field trip following the individual format designed by them.

This format provides both the teachers and students with a learning environment which often extends into the classroom beyond the day spent on the Refuge. The EE staff, SCA's and volunteers offer training and support both before and during the field trip. By having teachers prepare their field activities and recruit parents to help conduct them, the EE program can effectively reach more students with individual attention than had the staff conducted the field trips by themselves. A high adult/student ratio (2 adults to every 10 students) is important to enhance the learning experience. One adult is a small group chaperone, moving with their group to each learning station. The other adult teaches particular activities at a learning station, repeating their activities for each group during the field trip day.

Before a field trip to the Refuge can be scheduled, at least one adult must attend a 4 to 5 hour field trip orientation workshop. The staff is available for individual planning sessions should teachers require assistance in planning their trips. A total of 14 field trip orientation workshops were offered at the EEC with 277 individuals participating plus 36 teachers who returned for 1 hour planning sessions. Ten field trip orientation workshops were held at the Visitor Center in Fremont with 232 teacher/leaders being trained. The confidence gained by the teacher and adult leaders at these orientation workshops culminates in a successful field trip.

In the fall of 1991, the Refuge environmental education staff was proud to continue free distribution of the Salt Marsh Manual -an Educator's Guide! The 220 page guide was designed to facilitate the discovery, learning and enjoyment of field trips to the San Francisco Bay National Wildlife Refuge. The guide contains background information, area maps, planning and group management hints, classroom and on site activities, and additional resource information. The activities in the guide are for grades K-8. The Educator's Guide is available free of charge to all teachers and group leaders who attend one of the Field Trip Orientation Workshops at either the Environmental Education Center in Alviso or the Visitor Center in Fremont. Those not attending the orientation can obtain a copy for \$10.00. The guide has been revised

yearly. In the fall of 1991, major revisions included new chapters on Bird Migration, Endangered Species, and Tides. In addition, the guide was correlated to the California Science Framework and other environmental education guides. (A copy of the table of contents of the Salt Marsh Manual has been included in the back of this narrative.)

a. Educator Workshops

The EEC staff was actively involved throughout 1991 with Project WILD, Aquatic WILD and Project Learning Tree which offer their curriculum guides only through workshops. Project WILD is an interdisciplinary wildlife education program that uses wildlife related instructional activities for grades K-12. The overall purpose is to conserve wildlife and natural resources. The Aquatic guide focuses on Aquatic-related habitats and is a resource for teachers to use when teaching about the San Francisco Bay ecosystem. Project Learning Tree focuses on preservation of forest habitats. These workshops were co-sponsored with Coyote Point Museum, an environmental education center in San Mateo County and with the Tarlton Foundation in San Francisco, a non-profit organization with Under Water World.

During 1991, Carol Preston, a Marine Science Specialist with the Tarlton Foundation, and Refuge Education Coordinator, Fran McTamaney, designed and conducted two new environmental education workshops. One was conducted to help educators, K-8, use the new state Adopt-an-Endangered Species implementation guide. This guide leads educators through the steps on how their schools can adopt-an-endangered species in their local area and take action to help save its habitat. The second workshop was conducted to encourage educators to use the National Wildlife Federation's Nature Scope guides. The theme of the workshop was based on the connection between birds, wetlands, and oceans. Activities were used from the nature scope guides; Birds, Birds, Birds; Wading Into Wetlands; Oceans All Around Us.

The Adopt-an-Endangered Species and Nature Scope Workshops were conducted, one each in the spring and fall of 1991. One each of Project WILD/Aquatic WILD and Project Learning Tree workshops were conducted in the spring. Another workshop on migration was designed and conducted in the fall at Coyote Point Museum in order to supplement their new exhibit on migration. A total of 175 educators and environmental education resource agency staff attended these 7 workshops.

b. Educational Resources

The Audio-Visual Lending Library for the environmental education program expanded in 1991 with both sites lending out audio-visual materials. The following briefly describes the videos now in our lending library.

Copies of the 13 minute VHS video *Who Did the Owl Eat?* and accompanying charts, curriculum, and script are now available for check-out by teachers and group leaders. This video depicts a barn owl's hunting and eating habits, regurgitation of an

owl pellet and directions on how to dissect a pellet and are appropriate for grades first through sixth. Teachers are encouraged to copy the tape and many of the charts to have in their school curriculum library for future use. Other refuges have copied the tape to lend out to teachers.

The 25 minute video about S F. Bay and the Delta called *Secrets of the Bay* shows the history of the bay and its sometimes conflicting interests. This video is appropriate for grades fourth through college.

Fabulous Wetlands is an 8 minute video that takes a humorous, yet informative look at wetlands -- what they are, how important they are, and what we can do to protect them. This is perfect for pre-field trip preparation. This video is appropriate for grades third through high school.

A Home for Pearl and accompanying guide is a video that teaches about wildlife habitats. It is divided into four parts: two 15-minute segments and two 20-minute segments. Each can be viewed as a separate unit incorporating supplementary activities provided in the guide. This video is appropriate for grades first through sixth.

c. Educational Programs and Committees

National Committees

National Committee for Fish & Wildlife Service , The Outreach and Education Training Task Group - Members of The Outreach and Education Training Task Group participated in the National Park Service's Harper's Ferry Education Course in January, 1991. The thought was that a common experience could facilitate the process of developing a course tailored to meet the needs of the service. In the fall of 1991, the Service held a workshop called Setting Environmental Education Directions (SEED) to clarify the needs of education and outreach for the Service. With the information gathered at both these events, the next step was to draft a proposal for instituting a framework for training in education and outreach and to develop a national course to be conducted in fiscal year 1992 or 1993. Task group members: Janet Ady, OTE; Patty Reilly, OTE; Fran McTamaney, SFBNWR, Region 1; Libby Hopkins, Region 5; Matt Gay, Region 5

State Organizations

California Aquatic Science Education Consortium (CASEC) - In 1990, a consortium of agencies, organizations, and citizen groups was established for the purpose of encouraging, supporting, and enhancing aquatic (fresh and marine) education programs for informal groups in the State of California. The initial formation of CASEC was funded by a grant from the National Science Foundation. To accomplish its objectives, the Consortium is supervised by a Board of Directors. SFBNWR is represented on this board.

The first CASEC project that is being funded is the development of five aquatic curriculum units. One unit, Plastics in the Ocean is complete. Two units, Physical Characteristics of Water and Water Pollution are in draft form. The unit on Wetlands is being developed and the last unit to be worked on will be Stream and Riparian Habitats. In October of 1991, a conference, The Partnerships for Aquatic Instructional

Resources Fair, was held to promote communications between provider organizations and to train youth group leaders to use the first curriculum unit. The Refuge representative serves on the Wetlands curriculum development committee. (See the addendum at the back of this narrative for the brochure of this organization.)

Adopt-A-Beach School Education Program - California's Adopt-a-Beach program, organized by the California Coastal Commission, gives people of all ages the opportunity to learn about and actively participate in conserving coastal resources. The program encourages organizations and schools all along our coast to 'adopt' a local beach, and to effect change through beach clean-ups, recycling and community awareness. This program integrates conservation and marine science education. It provides an opportunity for students to observe how their actions directly impact the health and future of the environment. Fran McTamaney of the SFBNWR and Carol Preston of the Tarlton Foundation were asked by the California Coastal Commission to develop a workshop format for teaching educators how to use the curriculum guide in the Adopt-a-Beach program.

California Endangered Species Education Program - The California Endangered Species Education Program is an outgrowth of SB 885, introduced in the State Senate by Senator Gary K. Hart of Santa Barbara. The possibilities are exciting. Audubon has joined the California Department of Fish and Game and the California Department of Education as co-sponsors of the program designed to help students learn about endangered wildlife and develop ways that they can help save endangered species in their communities. This program not only involves students in studying about wildlife, but encourages them to take an active role in its protection. Briefly students will:

- * Identify endangered species of plants and animals in nearby habitats
- * Adopt a local endangered species through a democratic process
- * Research the threats to its habitat with assistance from local resource groups
- * Design a plan to educate the community about the threats to the endangered species habitat
- * Prepare a plan to save the habitat with community assistance.

All K-8 schools in the state are encouraged to participate, and plans will be submitted to a state-wide competition. An Adopt-an-Endangered Species Resource Guide helps schools and local community resource people on the "how to's" of the program. Fran McTamaney of the SFBNWR and Carol Preston of the Tarlton Foundation developed a workshop format on how to make the best use of this guide. These organizations offered Adopt-an-Endangered Species workshops in the spring and fall of 1991. In addition, Fran and Carol, worked with Meryl Sundove of National Audubon to produce a prototype workshop format that can be used throughout the state. In 1991, three local schools that sent teachers to these workshops at the EEC adopted the salt marsh harvest mouse, the clapper rail and the burrowing owl as their school project.

Regional Organizations

MEEA - Recycling Partnership for Schools and Business Project - The Recycling Partnership for Schools and Businesses is a project of the Mid-Peninsula Environmental Education Alliance (MEEA) and the Santa Clara County

Manufacturing Group Environmental Committee (SCCMG). MEEA is a group of non-profit organizations working together to bring different aspects of environmental education to our communities. The San Francisco Bay National Wildlife Refuge is a member of MEEA represented by their Environmental Education staff. Fran McTamane, EE Program Coordinator, is a member of the advisory committee for this project. SCCMG was interested in developing a community-wide environmental education project. They approached MEEA for ideas. Brainstorming among representatives from MEEA affiliates and members of SCCMG resulted in a project which combines the resources of businesses with the future of our community -- kids.

This program employs recycling as a catalyst for building school-business partnerships based on the Adopt-A-School concept. Initially, it targeted middle-schools: the goal was to help each school and its business partner incorporate the 3R's of recycling -- reduce, reuse, recycle -- into its daily operations. As part of the program, a guidebook was developed, based on what the program should accomplish -- including allowing enough flexibility for each partnership to individualize its program in response to its particular situation. In the second year, fall of 1991, 17 schools and businesses formed partnerships. In future years individual businesses and schools aided by the comprehensive guidebook will be able to set up and manage their own recycling partnerships. (See the addendum at the back of this narrative for the order form on The Recycling Partnership For Schools & Businesses How-to Guidebook.)

San Francisco Estuary Curriculum Project - Because of the growing concern for the health of San Francisco Bay and the Sacramento/San Joaquin Delta Estuary, the U.S. Environmental Protection Agency established the San Francisco Estuary Project (SFEP), a cooperative local, state and federal program. The SFEP is charged with developing and promoting effective management of the estuary, including restoring and maintaining its water quality and natural resources.

In May 1989, the project identified the need to develop full public education and an involvement plan for intensified public outreach to gain support for restoration of the estuary as outlined in the SFEP's 1989 Scope of Work for the Public Involvement Program. The four major target audiences included children, SFEP constituent groups, the general public, and local, state and federal decision makers.

Since children represent the future, the Estuary Project can help build a life-long ethic in the generations to follow by focusing on education programs and activities at public and private schools. To accomplish this task, The San Francisco Estuary Curriculum Project was formed in 1990. The SFBNWR is one of the environmental organizations that provided as an advisor to the estuary curriculum committee. Activity guides were developed for K-8 grades and 9-12 grades and a resource guide to the Bay area was included for additional information. The activity guides cover eight habitats connected to wetland studies; Open Water, Mudflats, Tidal Marsh, Seasonal Wetlands, Riparian, Upland, Vernal Pools and Salt Ponds. Each habitat is studied through an identified species. These activity guides can augment and expand current bay/marine science education taught in Bay-Delta schools.

The Grassland Resource Conservation District Wetland Education Center - The proposal to develop the Grassland Resource Conservation District's Wetland Education Center is a cooperative community project which has a great deal of support. Organizations involved in the planning stages include surrounding school districts, CA Dept. of Fish & Game, and U.S. Fish & Wildlife Service. SFBNWR has a representative on the site selection committee. The goal of the Wetland education Center is to provide an off-campus educational facility for students and teachers. A conference center, laboratory, field study stations and nature trails will provide materials and the setting. The Center will be located in a local setting where riparian wetlands, natural seasonal and permanent wetlands, native grasslands, and agricultural crops occur together. A site possessing this complex mosaic of habitat types will attract a variety of wildlife and provide a variety of educational opportunities that can be integrated into the California science framework.

Natural Resources Education Consortium - The Natural Resources Education Consortium is a group of agencies that formed to meet a common objective: to teach children about conservation of natural resources and to teach science at the same time. In other words - making the connections. The agencies involved are The Santa Clara Valley Water District, Pacific Gas and Electric Company, the City of San Jose Office of Environmental Management, Environmental Volunteers, San Jose State University, Department of Earth Sciences, Waste Management, U.S. Geological Survey, the Santa Clara County Office of Education, San Francisco Bay National Wildlife Refuge, and the Youth Science Institute.

Natural resource education involves the teaching of the fundamental principals of science. Whether it be about water and the water cycle, decomposition of food wastes and yard debris or geological formations in the valley, it is important that students not only understand how to conserve natural resources but, where they come from, how they are formed and what their function is in the environment.

California's new science framework integrates the teaching of life, physical and earth sciences into the school curriculum. The consortium decided to use this integrated approach by providing curriculum, materials, and workshops for teachers to meet the requirements of the framework. The first workshop will be in March, 1992 for K-8 grades. The focus will be on Water: Making connections with our natural resource through the water cycle. A 1992 Conservation Calendar will be designed to represent a band of characters called Hubcaps and Axles who live a conservation lifestyle. Each month has a conservation message and teachers will be provided with ideas for activities and resources for more information about each months theme. Future projects and workshops will be partially funded by grants applied for through the Consortium.

H4. Interpretive Trails

The Refuge has two trails with interpretive wayside exhibits. These displays describe the habitat, the cultural history, the ecological dynamics and geology of the areas that visitors walk through. They are entertaining, easy to read, visible without being intrusive and serve as an important supplement to our interpretive effort.

The self-guided trails are especially important during hours when the Visitor Center is closed. From 5pm to sunset, and before 10am, trail use is often heavy. Refuge volunteers patrol the trails talking with visitors and providing more information to people as needed. They also pick up trash and make note of the wildlife they see.

The Refuge's main interpretive trail, the Tidelands Trail, is registered as a National Recreation Trail in the National Trails System.

H5. Interpretive Routes

Nothing to report.

H6. Interpretive Exhibits, Demonstrations and Special Events

During 1991, 160,000 visitors participated in interpretive activities at the Refuge. Almost 153,000 took advantage of our self-guided interpretive trail or visited the visitor center to watch films or videos and look at the educational displays. The remaining 6800 participated in the numerous naturalist-conducted programs such as walks, van tours, talks, slide presentations, bicycle and canoe trips. Astronomy programs were held once a month throughout the year. Volunteers leading the astronomy programs provided telescopes and expertise for these popular events.

Every day brings a steady stream of inquisitive Refuge visitors past our Visitor Center reception desk. Our volunteers who daily staff the desk are knowledgeable and always willing to help out. We would not be able to present the variety of programs we do without them.

The natural history of the Refuge was well represented in our 1991 programs with topics such as salt marsh ecology, insects, birds, seasonal wetlands, endangered species, edible plants, geology and mammals. Our volunteers staff was quite active during 1991 giving 95% of our weekend public tours and interpretive programs. A number of programs of global importance were also given by local experts. Topics such as Ocean Pollution, Air Quality and Rainforest Ecology were presented and well attended by the public. For complete descriptions of these programs, look in the calendar section of the *Tideline* newsletters included at the back of this narrative.

Our program audiences were as diverse as the program topics that we presented. Audubon chapters, day care centers, garden clubs, historical societies, scout troops, community groups, senior centers, teachers associations, college classes, and women's organizations, among many others, took advantage of the available programs. The greatest demand for naturalist-led activities, however, came from families who discovered the wildlife resources of the Refuge and the Bay area.

Among the most popular activities during 1991, were the tours of Drawbridge, an abandoned sportsperson's community in a salt marsh setting. The dilapidated town stands as a reminder of the consequences of human destruction of the native environment. This was the theme as 900 people visited the area during tours offered on Saturdays from May through October. Other weekday and weekend tours were arranged by special request for walking clubs, photography groups and other organized groups.

Many off-site events helped to increase public recognition of the Refuge and its programs. During 1991, volunteers staffed information booths at local festivals such throughout the Bay Area such as the Berkeley Bay Fair, the Bay Area Environmental Education Resource Fair, Sulphur Creek Wildlife Day, People, Pride and Progress in Newark, the Crab Cove Sea Fair and Wetlands Day and others. Throughout the year, staff members spoke to numerous civic, business, church and social groups, providing nearby communities a service while disseminating information about the Refuge and its resources. Career talks were frequently given to students at local high schools and intermediate schools.

Special events were held at the Refuge during 1991. The following briefly describes these programs and events:

California Coast Clean-Up - For the fourth year, the Refuge celebrated COASTWEEKS by participating in the California Coast Clean-up Day. Refuge staff worked with other East Bay organizations (East Bay Regional Park District, Hayward Area Recreation District, Alameda County Public Works, Cities of Fremont and San Leandro and the East Bay Conservation Corps) to coordinate clean-up efforts in Alameda County. Many private business contributed to the Clean-up either financially or with equipment. The day could not be so successful without the cooperation of so many individuals and groups.

The Refuge organized Clean-ups sites at three different locations on the Refuge, the Dumbarton Fishing Pier, the Ravenswood Trail and the Coyote Creek Lagoon Trail. Refuge volunteers and staff and maintenance staff from Coyote Hills Regional Park were on hand to register volunteers, distribute bags, drive vehicles and do everything else needed to make the clean-up a success. Over 600 volunteers from local communities turned out for the four hour clean-up. Eleven tons of debris was collected from the three sites on the Refuge. Plastics, glass and aluminum were collected separately and recycled by the California Conservation Corps. The bags were provided by the California Coastal Commission, California Department of Transportation and the Refuge. Waste Management, Inc. provided dumptrucks and drivers. The East Bay Regional Park District sponsored a picnic after the Clean-up and distributed free t-shirts. A copy of the flyer advertising the Clean-up is included at the back of this narrative.

The 1992 Clean-up will probably vary somewhat. The number of people participating in the Clean-up in Alameda County is getting to be too many for a centralized picnic and t-shirt distribution. We plan, however, to continuing coordinating resources and efforts with the other organizations again for the 1992 Clean-up.

Kid's Day - Our annual Kid's Day was held in September again this year. Over 400 kids and their parents were in attendance throughout the day. Programs included a bird banding demonstration, Native American storytelling, and presentations on reptiles, local wildlife and fish and whales. Kids were also able to participate in activities such as creating insects, marsh art, face painting, owl pellet dissection, brine shrimp observation and a scavenger hunt. Refuge volunteers and local wildlife groups helped with the activities and programs. A copy of the flyer advertising our 1991 Kid's Day is included at the back of this narrative.

Halloween Open House - Our annual Halloween Open House was held in late October at the Refuge Visitor Center. Over 650 people enjoyed video and slide presentations, Drawbridge tours, face painting, pumpkin decorating and many other hands-on activities. A copy of the flyer advertising our 1991 Halloween Open House is included at the back of this narrative.

Earth Day/National Wildlife Week - Again this year, a special event day was held to celebrate Earth Day and National Wildlife Week, two nationally recognized events. Almost 1000 people turned out. The day consisted of hour long programs in the Visitor Center auditorium on a variety of topics related to wildlife. Local wildlife groups put on these special programs. These groups also had information tables and hands-on activities going on throughout the day. Refuge volunteers helped with other information booths and activities. It was a busy day with lots to do for the young and not so young! The Endangered Species Poster Contest awards ceremony was held during this day. See Section H.7. for more information about the poster contest. A copy of the flyer advertising the 1991 Earth Day is included at the back of this narrative.

Fishing Day for the Disabled - In conjunction with 1991 National Fishing Week, a fishing day was held with a target audience of people who fish and are disabled. An interpreter from a neighboring park was asked to put on the interpretive programs and the local fishing club was on hand to help with the programs and pier fishing. The day long event was full of things to do. All regular publicity for the event went out in addition to special advertising to local disabled groups, homes, etc. There were exactly 10 people who showed up for the day; one was disabled. It was decided not to target such a limited audience again for this type of event. A copy of the flyer used for this day is included at the back of this narrative.



Refuge Volunteer, Doris McCormick is a regular at the Visitor Center front desk. She enjoys talking with and meeting people. She always makes visitors to the Refuge feel very welcome.



Refuge Volunteers, Jean Noll, Mary Ann Irvine, Sue Ten Eyck and others were ready when the first of 600 volunteers checked in to work during the annual Coast Clean-up Day.



Refuge Volunteer and Explorer Scout, Ramona Couvson readies her scavenger hunt activity table before the doors are opened to those waiting to participate in Kid's Day activities.



A happy artist and satisfied customer at our annual Halloween Open House.

H7. Other Interpretive Programs

In spite of all of the efforts that we made during the year to contact the public, we know that there are many thousands (millions) of people out there who don't know about us or whose interests do not include endangered species, wetland preservation, migration, waterfowl populations or anything else along those lines. Reaching *these* people is one of the most challenging tasks with which the education and outreach staff is confronted. People first need to know that the Refuge exists, then the next step in reaching them is getting them out to the Refuge where they can see with their own eyes what sort of job we are doing and what needs to be done in order to protect wildlife habitat.

In order to get the word out about us and to ultimately get people to the Refuge, the education and outreach staff participated in some non-traditional education and outreach efforts. The following briefly describes what projects were undertaken in 1991.

Tideline - Foremost among our non-traditional interpretation efforts was the production of a quarterly newsletter, *Tideline*. A copy of each issue of the newsletter is included at the back of this narrative. In 1991, *Tideline* was distributed quarterly to nearly 28,000 Bay Area households, school, businesses, churches, hospitals and libraries. It was considered to be our very best means of communicating our program schedules, announcements, news stories, advertisements and editorial comments. In fact, many of our programs were filled to capacity by *Tideline* recipients. The *Tideline* was used as a text at a training course for urban managers at the National Park Service's Training Center at Harper's Ferry in West Virginia. It was also used as a supplement to formal text books in many high school biology classes. We repeatedly get requests from biology teachers for subscriptions for that purpose.

Tideline, which is financed by the San Francisco Bay Wildlife Society, took on a new look with the Fall 1991 issue. It is now in a format which can easily be put in a 3-ring binder and saved as reference material. Our mailing list was managed by Volunteer Howard Collins, who coordinated additions, deletions and changes to the list. Volunteers also helped with the labeling of the issues before mailing. Without volunteer assistance, *Tideline* would not be possible.

Native Plant Symposium/Sale/Nursery - In 1991, San Francisco Bay Wildlife Society established a Native Plant Nursery to grow plants that could be used to enhance native habitat on this and other Refuges. It was also established to serve as a vehicle for reaching out and contacting non Refuge visitors thus bring them to the Refuge. Several thousand dollars in contributions were solicited and the Nursery was begun. A shade arbor was constructed, and local nurseries and corporations donated potting tables, five cubic yards of planting mix, hundreds upon hundreds of 4-inch, 1-gallon, 5-gallon and 15-gallon pots, and fifty pounds of fertilizer.

The California Conservation Corps supplied much of the plant material with which the nursery began. More native plants (50 coast live oak trees in 5-gallon cans, 25 valley oak trees in 5-gallon cans, 50 vine maple trees in 7-gallon cans, and so forth) were

contributed by commercial nurseries. The chief grower for a Bay Area chain of 8 nurseries served through the year as the Director of the nursery. Volunteers performed the labor, and by October we had a full-fledged nursery in operation in the Refuge's maintenance yard.

On October 6, we held a Native Plant Day with guest speakers, workshops, demonstrations, and the sale of 35 species of California native plants. The event attracted 1200 visitors who came to the refuge to learn about native plant horticulture, and went back home at the end of the day knowing about the National Wildlife Refuge System, the importance of wetlands, and the value of planting with native species. A copy of the flyer advertising this event is included at the back of this narrative.

Just over \$4,600.00 was raised for San Francisco Bay Wildlife Society from plant sales, and another \$1,000.00 from book sales, contributions and memberships.

At year's end, the Native Plant Nursery was growing four species of native grasses for use at San Francisco Bay National Wildlife Refuge and Sacramento National Wildlife Refuge Complex. Other native species were being propagated for planting in various locations by Boy Scout eagle candidates and their troops. Refuge volunteers landscaped the new Environmental Education Pavilion with native plants from the Nursery, and we were planning for the revegetation of a levee with native coyote bush, salt bush and mixed grasses.

Clearly, the Native Plant Nursery will become an important part of both San Francisco Bay Wildlife Society and of an urban refuge in constant need of botanical rehabilitation.

Wildlife and Nature Arts and Crafts Sale - The annual arts and crafts sale sponsored by the San Francisco Bay Wildlife Society was held off the Refuge at DeAnza College again this year. Due to time and location constraints the show was held on only one weekend. A complete description of this event may be found later in this narrative under section H.18. - Cooperating Associations.

Endangered Species Poster Contest - Another non-traditional interpretative effort was the Refuge's ninth annual Spring Poster Contest, which attracted 900 entries by artists in grades K-6 from three local school districts. The contest theme for 1991 was "Endangered Species".

First place winners in each grade won free passes for themselves and their parents to the Monterey Bay Aquarium. Second place winners and their parents won a trip to the San Francisco Zoo. Third place winners each won a pass for three to California Academy of Sciences in San Francisco's Golden Gate Park. All winners and honorable mentions received ribbons. A copy of the flyer advertising the poster contest is included in the back of this narrative.

We feel that a poster contest is a good way to reach members of the public who might otherwise never make it to the Refuge. These students spent hours (days) preparing posters which advocated the preservation of San Francisco Bay, and endangered wildlife. In the process, each artist may have convinced him/herself that a conservation endeavor is a worthwhile pursuit. This is difficult to measure, but, considering the persuasive, convincing nature of most of the posters, we feel that many advocates of our conservation ethic were either created or reinforced.

In addition, the awareness level of many South Bay students (as well as teacher and parents!) was heightened and *many* visitors checking in at the Visitor Center desk stated that their curiosity had been piqued by the contest, and that they were here to see who we were and what we were all about.

Artist's Receptions - During 1991, the Refuge held receptions for two local artists who were exhibiting their original wildlife artwork in the Visitor Center auditorium. The receptions were advertised in the *Tideline* and special invitations were made and sent to the artist's mailing lists. San Francisco Bay Wildlife Society provided refreshments. The receptions were well attended and attracted many people who were first time visitors to the Refuge. The invitations and flyers advertising these events are included in the back of this narrative.

California Clapper Rail Brochure - The number of California Clapper Rails is steadily declining and it's estimated that fewer than 500 still exist. In 1991, the Refuge started a red fox predator management program. Refuge staff felt it was important to do everything possible to educate people about the plight of the rail and about the management plan in place for the red fox. In 1991, with funding from the Santa Clara Valley Audubon Society, Refuge staff and volunteers produced a brochure entitled "Going...going...gone? The Life and Times of the California Clapper Rail". This brochure has been widely distributed throughout the South Bay Area. A copy of this brochure is included in the back of this narrative.

Gray Whale Skeleton Recovery - In the summer of 1991, a dead gray whale was found along a marsh on the Refuge. It was decided to try and recover the bones of the whale in order to restore the whale skeleton for display. The whale was left to decay for about two months at which time staff and volunteers made a number of trips to the marsh to recover the bones that were now devoid of flesh. Many of the bones had to be dug up out of the mud and then all the bones had to be carried out to a salt pond levy to a waiting truck. Most of the bones of the skeleton were recovered along with both pieces of baleen. The bones are now being stored. We are investigating preservation and display options for the 40-foot whale skeleton.



Volunteers Ida Berkowitz, Tooky Campione and Margaret Lewis enjoy some social time while labeling Tidelines before mailing.



During the very popular Native Plant Sale, it is often difficult to choose just the right plant!



Visitors at the Native Plant Sale and Symposium learn about composting.



Local artists Veronica Muela, Linda Patterson and Kathy Yee work together as judges to choose the winning posters among 900 entries in our Endangered Species Poster Contest.



With awards in hand, winners in the 1991 Endangered Species Poster Contest pose for a picture after the awards ceremony held during Earth Day and National Wildlife Week Activities.

H9. Fishing

Public use of the access along the Dumbarton Point Trail (south end of the fishing pier) and the Shoreline Trail (north of the fishing pier) continued to increase. Use of the Dumbarton and Ravenswood Fishing Pier stayed about the same as last year. Approximately 25,000 anglers used the piers and the surrounding fishing areas in 1991.

Fishing from or near the piers has netted a variety of fish: leopard shark, sand shark, bat ray, shiner surf perch, kingfish, bullhead, and the elusive striped bass, white sturgeon and salmon.

Volunteers patrolled the fishing piers and shoreline trails on foot and by bicycle. Most patrolling was conducted during the weekends. Volunteers would talk with the people fishing and give out information as needed.

H10. Trapping

Nothing to report.

H11. Wildlife Observation

The opportunity to view wildlife in its natural habitat attracts many of our visitors. In close proximity to the Visitor Center is a variety of habitats such as salt marsh, sloughs, extensive mud flats, open water and upland coastal chaparral, grassland and trees. This range of habitats provides an ideal area for visitors to explore, on their own or with our naturalists, when seeking local wildlife.

Some visitors participated in van tours or canoe trips to Mallard Slough and Triangle Marsh, where marsh-nesting and feeding birds were easily seen. Most visitors walked or biked the many miles of Refuge trails on their own viewing migrating and wintering shorebirds and waterfowl during the winter months, resident nesting birds and young birds during the spring and summer months. Bird watchers revel in these opportunities. In addition, many nature study groups led field trips to our Refuge, and the Audubon Society once again conducted its annual Christmas bird count here.

One of the most popular sites for local bird watchers was the restored tidal area, Avocet Marsh, where great numbers of shorebirds and migrating waterfowl gather to feed. There is also a peregrine falcon commonly sighted here.

In July, the Refuge participated in the 15th Annual 4th of July Butterfly Count conducted by the Xerces Society. The event was announced in *Tideline* and drew a number of seasoned, professional lepidopterists as well as first-time amateurs. The counters spent the day searching out butterflies near the Visitor Center and EEC, as well as a nearby riparian corridor, and amassed a total of 27 species. It was great fun for everyone and will be repeated in 1992!

H12. Other Wildlife Oriented Recreation

Nothing to report.

H13. Camping

Nothing to report.

H14. Picnicking

Nothing to report.

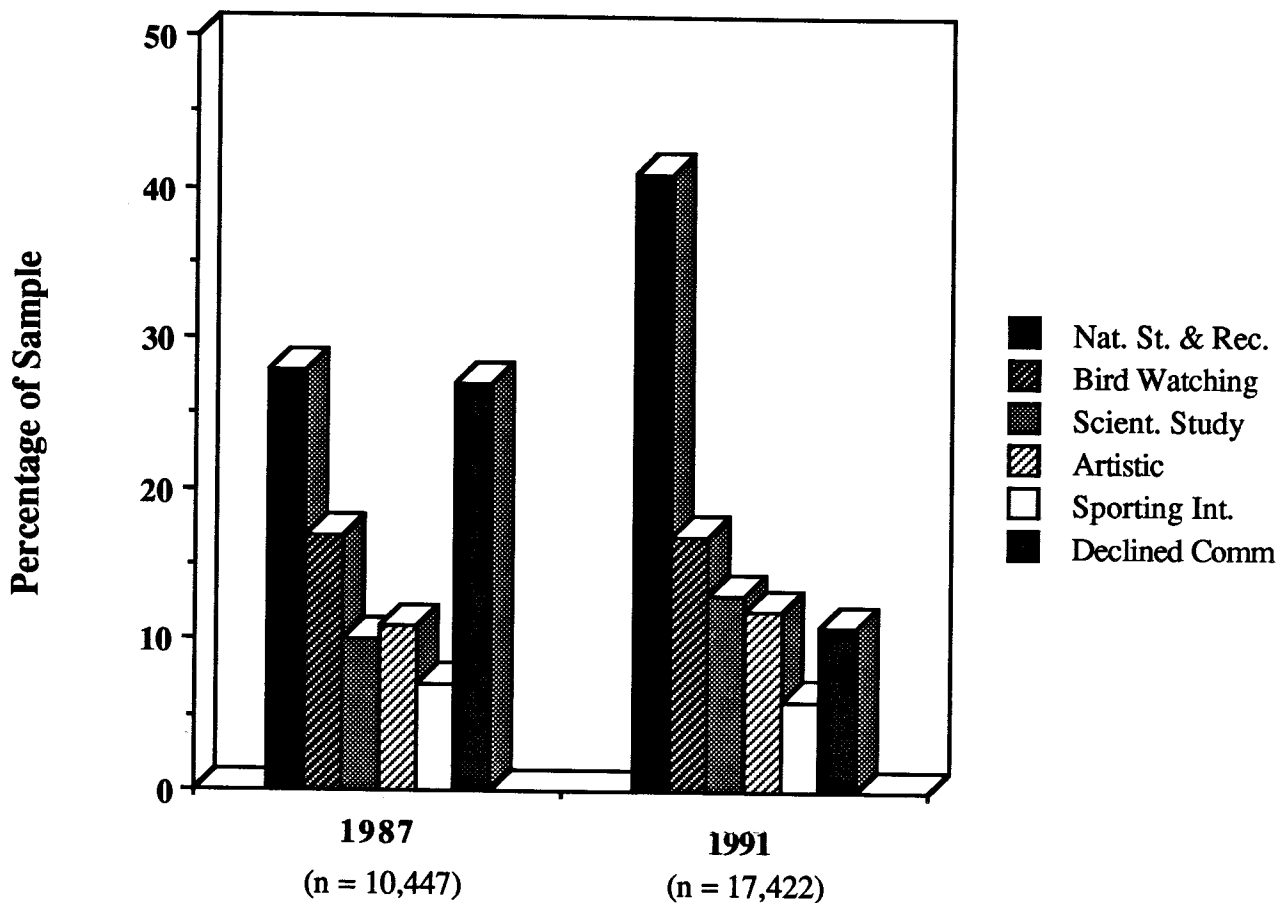
H15. Off-Road Vehicles

Nothing to report.

H16. Other Non-Wildlife Oriented Recreation

Nothing to report.

Visitor Interests at San Francisco Bay N.W.R.



This graph illustrates non-randomly acquired data from visitors to San Francisco Bay National Wildlife Refuge who sign up in the Visitor Center to receive Tideline newsletter. When filling out subscription forms, visitors have the option of indicating areas of interest which will allow them to be targeted for selective mailings. For instance, the refuge has in the past sent flyers to people who indicated "Artistic" interests, in order to promote our Marshlands Art Academy for children.

During the past five years, the First category, "Nature Study and Recreation," has grown from 28% of respondents in 1987 to 41% of respondents in 1991. "Birdwatching" has remained the same at 17%, "Scientific Study" has increased from 10% to 13%, "Artistic" has increased from 11% to 12% and "Sporting Interests" (hunting, fishing, etc.) has decreased from 7% to 6%. Nonrespondents have decreased from 27% to 11%.

H18. Cooperating Associations

San Francisco Bay Wildlife Society completed its fourth full year of operation in 1992. This non-profit corporation helps sponsor and finance education and outreach programs at the Refuge. In order to do this, the Society needs money and money was generated in a variety of ways throughout the year. Wholesale and retail sales of books, pamphlets and theme-related items brought in \$52,350. Membership dues, donations and interest amounted to \$10,000. Our art show, native plant sale and seminars grossed \$14,000. Total receipts for fiscal year 1991 were \$75,790.

We had to pay many bills with this money such as, purchase of the books we sold (\$28,000), sales tax (\$5257), accounting and tax service fees (\$1680) and repayment our start-up loan (\$4000). Even after expenses, we had enough net profit to print four issues of our newsletter, *Tideline*, (\$15,590), fund a petty cash fund for the environmental and outreach program (\$2687), buy a video microscope (\$3560), a Bio-scope (\$500) and a MacIntosh IICX Computer (\$2250) and support the public use program with a great many miscellaneous purchases such as postage stamps, administrative supplies, film processing, etc. (\$3000).

We continued operating sales outlets at Klamath Basin Refuge and Sacramento Refuge during 1991. Thanks to the efforts of the staff and volunteers at both of these Refuge, sales increased at both places again this year. Klamath Refuge had gross sales of \$13,473 and Sacramento Refuge, in its first full year of operation, grossed \$4084.

Our eleventh annual Christmas Wildlife and Nature Arts and Crafts Show was a success. Total artist sales were \$14,300, about 28% less than planned (most artists reported that their overall sales for the year at other shows were also lower due to the current recession). Net revenue was \$2280, 33% above our projection and only 6% less than the total revenue from the two 1990 shows. This relative improvement in the surplus was based on strict cost controls and higher than anticipated income from donations (\$500), the raffle (\$500), food sales (\$900), and artists' application fees (\$4000). The major positive notes for this year's show were improved satisfaction by both the artists and the public with the quality of the arts and crafts. We also had very positive feedback about the addition of an Environmental Fair; environmental organizations from around the Bay Area were able to set up a booth for the weekend to give out information about and sell items from their organization. A survey of artists and volunteers showed unanimous support for bringing the show back to the Refuge in 1992.

In the Spring and Fall of 1991, the Society again sponsored an adult seminar program called "Explore the Wild". The spring courses offered were:

- * Big Basin Birds - March 9
- * Desert Ecology - April 4, 5, and 6
- * Rare, Endangered, and Common Wildflowers of Santa Clara Co. - April 12, 13
- * Natural History of Yosemite National Park - May 11 and May 17, 18, and 19
- Natural History of Point Reyes National Seashore - May 25
- Geology of Pinnacles National Monument - May 26

- * Environmental Living - March 23
- Insects of the Santa Cruz Mountains - April 19 and 20

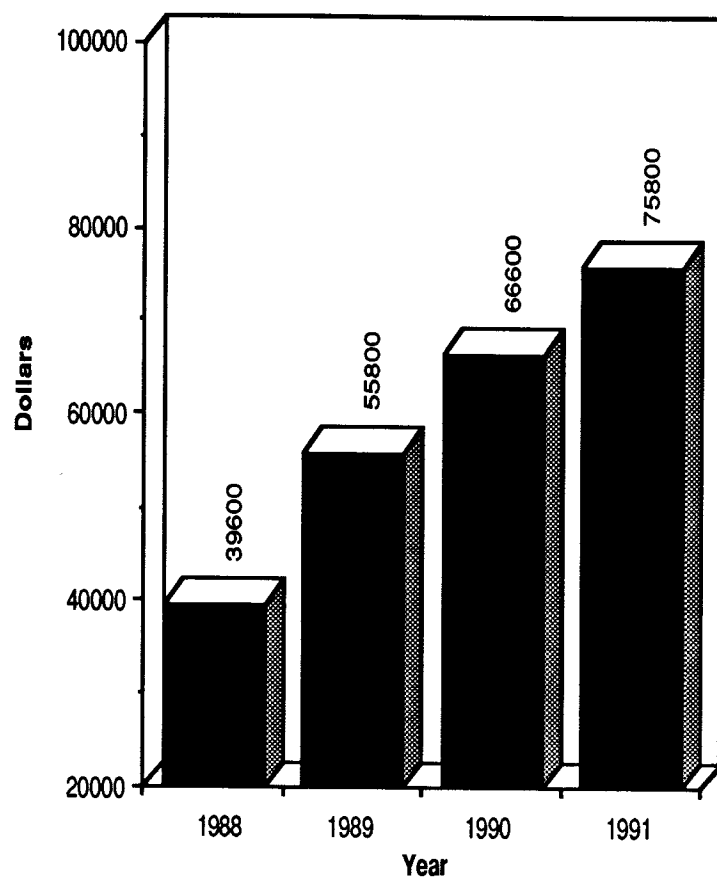
The fall courses offered were:

- * Images of Marine Flowering Plant Communities - September 7 and 8
- Geology of Lassen Volcanic National Park - October 5 and 6
- Tule Technology of the California Indians - October 26

All courses marked with an *, except the Natural History of Yosemite National Park, were canceled due to inadequate enrollment; the Yosemite seminar was canceled by the instructor. The Geology of Lassen Volcanic National Park served fifteen people and was led by a Refuge volunteer, Mansurali Nurmuhammad. The Tule Technology of the California Indians hosted 39 participants and was led by three people. Both seminars were successful. The Explore the Wild! Seminar Program will continue in 1992.

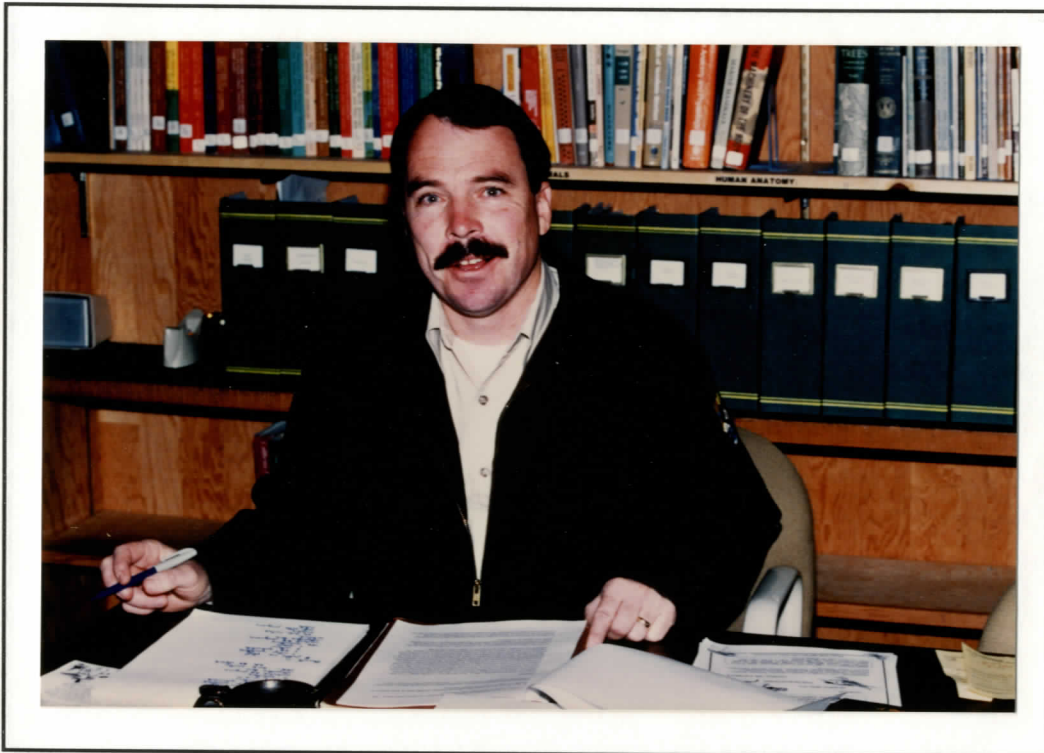
San Francisco Bay Wildlife Society plays an very significant role in the operation of the Refuge's Education and Outreach efforts. Like most programs at the Refuge, the Society could not exist without the many tireless hours contributed by volunteers. Volunteer Jean Noll completed her second year as the Society bookkeeper and our records have never been better organized. Stan Brown handles the entire Society membership operation. Howard Collins maintains the mailing list data base of 17,000 names for the *Tideline* newsletter. Sid Hollander again served as director of the Art Show coordinating all aspects of that fund-raiser. Volunteers help with all Society events like the art show and native plant sale; they sell the books in the bookstore and get people to become members of the Society. Nine people from the community serve on the Society's Board of Directors. The Director's provide expertise and advise about Society operations and approve Society expenditures and fund raising efforts. Thanks to all these people who helped make 1991 another successful year for San Francisco Bay Wildlife Society!

***San Francisco Bay Wildlife Society
Gross Revenue***



H19. Concessions

Nothing to report.



Outdoor Recreation Planner, John Steiner



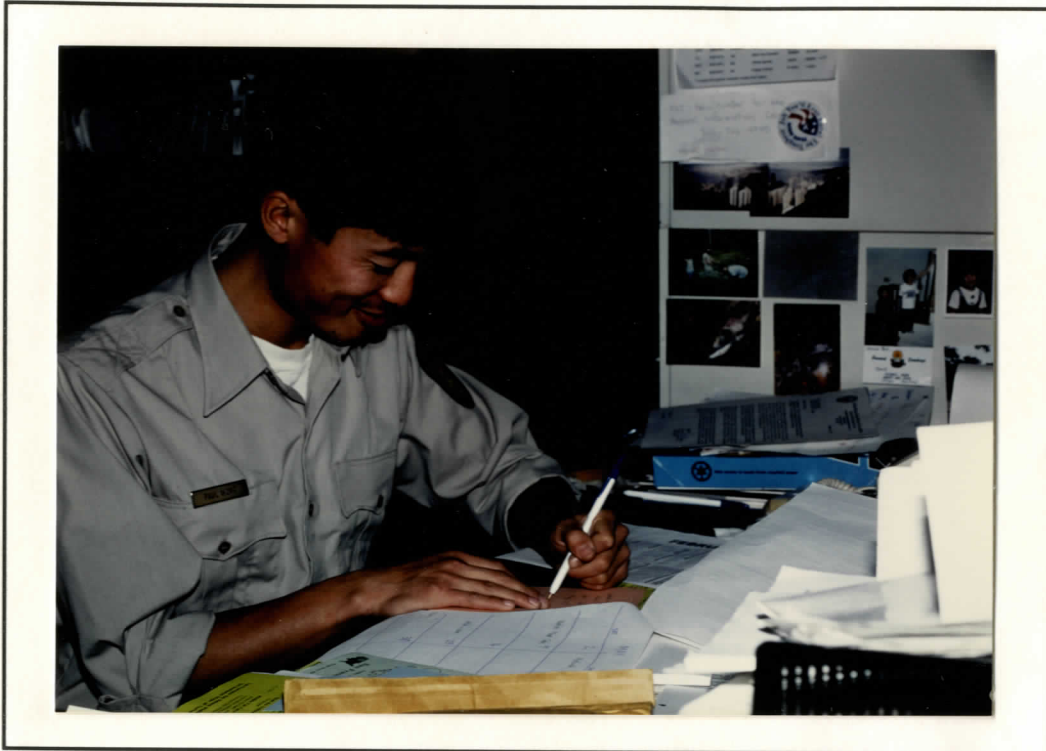
Interpretive Specialist, Sheila McCartan



Environmental Education Specialist, Sandy Spakoff and Volunteer Jean Noll



Environmental Education Specialist, Kathy Rickelmann and SCA Intern Joe Hunter



Interpretive Specialist, Paul Wong



Environmental Education Specialist, Fran McTamaney